

REMARKS

This is in response to the Final Office Action mailed September 1, 2009, a response to which is due January 1, 2009 with one month extension of time. Claims 1-17 are pending in the application; claims 12-17 are withdrawn from consideration. Pursuant to the Examiner's suggestion, claims 2 and 11 are amended herewith. After entry of this Amendment, claims 1-11 are pending for consideration. No new matter is added with this amendment. With regard to withdrawn claims 12-17, applicants request rejoinder of these claims when claims 1-11 are found allowable and will amend claim 12-17 to reflect the scope of the allowed claims, pursuant to the Examiner's explanation.

Applicants respectfully request the Examiner to enter this amendment and to consider this subject matter.

I. Claim Objections

According to the Examiner, "the heat," in claim 2 lacks an antecedent basis. In response, Applicants have amended claim 2 in accordance with the Examiner's suggestion.

The Examiner also objects to claim 11 for lack of clarity. Pursuant to the Examiner's suggestion, applicants have added –deformed—before "polymer" in line 2.

Applicants argue that entry of the amendments to claims 2 and 11 would be proper as such amendments comply with the Examiner's request.

III. Claim Rejections under 35 USC 103

The Examiner has rejected claims 1-4 and 7-10 under 35 USC § 103 over Eckl et al (US 6,478,494) ("Eckl") in view of Olsen (US 5,780,524) ("Olsen"). With regard to claims 1-4 and 7-10, the Examiner argues that Eckl teaches a method for the plastic deformation of polymers, including the polysaccharide chitin which is capable of forming intermolecular hydrogen bridge bonds, comprising simultaneously treating the polymers

with pressure and shearing and thermal energy supplied to the polymer, wherein the method is carried out at relatively low temperatures. The Examiner believes that the extrusion process simultaneously supplies pressure and shearing. The Examiner concludes that it would have been obvious to the skilled artisan to apply Olsen's laser to Eckl for the benefit of providing a non-contact heat source that allows a polymer to be deformed at less than its melting point. Applicants respectfully but vigorously traverse this rejection.

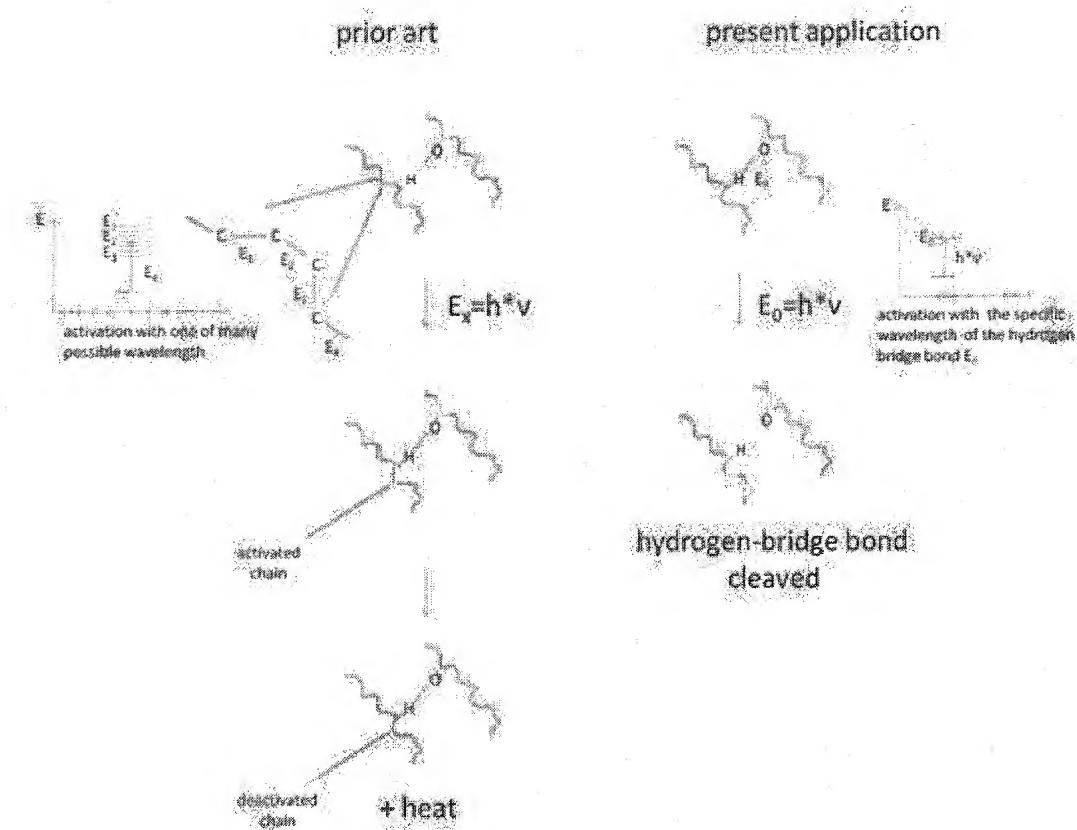
The Examiner's rejection appears to be based upon a misinterpretation of Eckl and Olsen. Applicants do not believe it is proper to combine these two references. The main difference between the subject matter claimed in the present application and the subject matter disclosed in Eckl and Olsen is an important one. Both Eckl and Olsen disclose that a polymer is molten by applying heat. Eckl teaches using natural oils to reduce the melting and extrusion temperatures for a process of extruding natural polymers. Thus, heat is an element to be controlled by the invention of Eckl. The Examiner acknowledges this. In the attached Rule 132 Declaration of the inventor, Johannes Schroeter, Dr. Shroeter agrees with this interpretation as well. The Examiner is correct that in Olsen, a laser is used for treating the polymer. However, this laser is used to heat the polymer. This is clear from the paragraph bridging columns 4 and 5 of Olsen, as follows:

Accordingly, the present invention provides a non-contact quantum mechanical heating process utilizing selective resonance energy heating technology. In this regard, infrared (IR) or visible/ultraviolet (UV) wavelength energy is utilized for the heating source. The thermoplastic fiber is excited to a higher energy state by absorption of laser energy of a resonance wavelength. This energy is eventually dissipated so the fiber (a molecular polymer) can relax to the stable ground state." (highlighting added).

Olsen also shows this feature in claim 1, part d), which states the following: "to continuously heat the fiber by resonant energy absorption of the laser beam." In his Rule 132 Declaration at paragraph 5, Dr. Schroeter confirms this interpretation of Olsen. In paragraph 6, he states that in his opinion, "both Eckl and Olsen teach using heat to

melt a polymer," that is, "Eckl teaches using thermal heat to extrude the polymer and Olsen teaches using laser radiation to heat a polymer fiber."

As Dr. Schroeter further explains, Olsen teaches that the fiber, *i.e.* the polymer itself adsorbs the laser radiation and is heated thereby. This is an intramolecular process which leads to heating of a polymer sample. In contrast, the process of the present invention treats the polymer with laser light of a wavelength that is not adsorbed by an intramolecular bond of the polymer but which selectively interacts with the bond energy of the secondary valency bonds of the polymer, which is the bond which holds different polymer molecules together. This bond which holds different polymer molecules together (usually hydrogen bridge bonds) is cleaved by absorption of the electromagnetic radiation of this specific wavelength. There is no dissipation of energy to create heat but the non thermic cleavage of hydrogen bridge bonds:



Therefore, if a skilled person had combined the disclosure of Eckl with Olsen, this would not lead to the subject matter claimed in the present application as such a combination would lead to a process in which the polymer is heated by laser light but not to a process as in the present application wherein a polymer is treated with electromagnetic radiation having a defined wavelength which corresponds to the bond energy of the secondary valency bonds of the polymer. This concept is not disclosed in any prior art. The reference submitted with Dr. Schroeter's declaration, *Cellulose*, 12: 159-165 (2005), further illustrates the invention and the concepts that distinguish it over the prior art.

In further response, and in view of the explanations provided by Dr. Schroeter, applicants point out that claim 1 has been amended to recite "wherein the electromagnetic radiation has a defined wavelength which is selected so that it corresponds to the bond energy of the secondary valency bonds of the polymer."

CONCLUSION

In light of the above amendments, explanations and declaration of Dr. Schroeter, Applicants respectfully request that all rejections and objections be withdrawn and that pending claims be allowed.

Should the Examiner believe that anything further is necessary in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event that additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required therefore are hereby authorized to be charged to our Deposit Account No. 01-2300 referencing docket number 029368-00035.

Respectfully submitted,



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